AMENDMENTS TO THE CLAIMS

Claims 1-22 (canceled)

Claim 23 (currently amended): A method for monitoring a biological process, said method comprising:

receiving image data of an object having one or more features, said image data corresponding to frames comprising a plurality of pixels;

dividing each frame into one or more regions based on the one or more features and each region into one or more subregions;

filtering pixels in each subregion according to a pixel intensity range to provide a filtered output of pixels;

defining for each frame a first area within each subregion, said first area defined by one or more predetermined shape equations according to a shape of a feature to be monitored in the subregion; ~~and~~

evaluating for each frame the number of filtered output of pixels in the first area for each subregion to transform the image data to a scalar feature signal for each subregion; and

transforming each scalar feature signal to produce a behavior indicating output signal for each subregion, said step of transforming comprising setting the value of the behavior indicating output signal to the value of the scalar feature signal at a first time if the value of the scalar feature signal at the first time is equal to or greater than the value of the behavior indicating output signal at a time preceding the first time and reducing the value of the behavior indicating output signal by a fraction if the value of the scalar feature signal at the first time is less than the value of the behavior indicating output signal at a time preceding the first time.

Claim 24 (previously presented): The method of claim 23 further comprising:

defining for each frame a second area within each subregion, said second area adjacent to said first area; and wherein

said step of evaluating comprises determining for each frame the difference between the number of filtered output pixels in the first area and the number of filtered output pixels in the second area and outputting a value of the difference to produce the scalar feature signal for each subregion.

Claim 25 (previously presented): The method of claim 23 further comprising:

detecting one or more changes in a feature in a first area of a subregion; and

modifying parameters of said shape equations defining said first area to correspond to the detected changes.

Claim 26 (canceled)

Claim 27 (currently amended): The method of ~~claim 26~~ claim 23 wherein said fraction being a function of time elapsed from the first time and wherein parameters of said function being determined by the biological process.

Claim 28 (currently amended): The method of ~~claim 26~~ claim 23 further comprising:

combining the behavior indicating output signals for each subregion to obtain a composite behavior indicating output signal to monitor the biological process.

Claim 29 (previously presented): The method of claim 28 wherein said step of combining comprises linearly combining the behavior indicating output signals.

Claim 30 (previously presented): The method of claim 28 further comprising:

correlating the composite behavior output signal with one or more independent measures of the biological process so as to increase the accuracy with which the composite behavior output signal monitors the biological process.

Claim 31 (previously presented): The method of claim 28 further comprising:

modifying the composite behavior indicating output signal pursuant to an algorithm under program control to produce a composite measure of the biological process; and

determining whether the composite measure is below a threshold.

Claim 32 (previously presented): The method of claim 31 further comprising:

sounding an alarm when the composite measure is below the threshold.

Claim 33 (previously presented): The method of claim 31 further comprising:

generating electrical control signals pursuant to an algorithm when the composite measure is below the threshold.

Claim 34 (previously presented): The method of claim 23 further comprising

acquiring image data via computerized microscopy; and

wherein the biological process is microscopic at the tissue, cellular or subcellular level.

Claim 35 (previously presented): The method of claim 23 wherein the biological process is macroscopic.

Claim 36 (previously presented): The method of claim 35 wherein the macroscopic biological process is drowsiness.

Claim 37 (previously presented): The method of claim 36 wherein the step of receiving image data includes receiving data of facial images of an operator.

Claim 38 (previously presented): The method of claim 37 wherein the one or more regions comprises an eye region, a mouth region and a facial boundary region.

Claim 39 (previously presented): The method of claim 23 further comprising:

acquiring said image data by a video unit.

Claim 40 (previously presented): The method of claim 23 wherein said step of filtering comprises:

determining whether a video intensity level of each pixel is within the pixel intensity range; and

setting the video intensity level to a predetermined value if the video intensity level is within the range and to another predetermined value if the video intensity level is outside the range to provide the filtered output.

Claim 41 (currently amended): An apparatus for monitoring a biological process, said apparatus comprising a processor programmed to perform a method, said method comprising:

receiving image data of an object having one or more features, said image data corresponding to frames comprising a plurality of pixels;

dividing each frame into one or more regions based on the one or more features and each region into one or more subregions;

filtering pixels in each subregion according to a pixel intensity range to provide a filtered output of pixels;

defining for each frame a first area within each subregion, said first area defined by one or more predetermined shape equations according to a shape of a feature to be monitored in the subregion; ~~and~~

evaluating for each frame the number of filtered output of pixels in the first area for each subregion to transform the image data to a scalar feature signal for each subregion; and

transforming each scalar feature signal to produce a behavior indicating output signal for each subregion, said step of transforming comprising setting the value of the behavior indicating output signal to the value of the scalar feature signal at a first time if the value of the scalar feature signal at the first time is equal to or greater than the value of the behavior indicating output signal at a time preceding the first time and reducing the value of the behavior indicating output signal by a fraction if the value of the scalar feature signal at the first time is less than the value of the behavior indicating output signal at a time preceding the first time.

Claim 42 (previously presented): The apparatus of claim 41 wherein the processor is programmed to perform the method further comprising:

defining for each frame a second area within each subregion, said second area adjacent to said first area; and wherein

said step of evaluating comprises determining for each frame the difference between the number of filtered output pixels in the first area and the number of filtered output pixels in the second area and outputting a value of the difference to produce the scalar feature signal for each subregion.

Claim 43 (previously presented): The apparatus of claim 41 wherein the processor is programmed to perform the method further comprising:

detecting one or more changes in a feature in a first area in a subregion; and

modifying parameters of said shape equations defining said first area to correspond to the detected changes.

Claim 44 (canceled)

Claim 45 (currently amended): The apparatus of ~~claim 44~~ claim 41 wherein said fraction being a function of time elapsed from the first time and wherein parameters of said function being determined by the biological process.

Claim 46 (currently amended): The apparatus of ~~claim 44~~ claim 41 wherein the processor is programmed to perform the method further comprising:

combining the behavior indicating output signals for each subregion to obtain a composite behavior indicating output signal to monitor the biological process.

Claim 47 (previously presented): The apparatus of claim 46 wherein the processor is programmed to perform the method wherein said step of combining comprises linearly combining the behavior indicating output signals.

Claim 48 (previously presented): The apparatus of claim 46 wherein the processor is programmed to perform the method further comprising:

correlating the composite behavior output signal with one or more independent measures of the biological process so as to increase the accuracy with which the composite behavior output signal monitors the biological process.

Claim 49 (previously presented): The apparatus of claim 46 wherein the processor is programmed to perform the method further comprising:

modifying the composite behavior indicating output signal pursuant to an algorithm under program control to produce a composite measure of the biological process; and

determining whether the composite measure is below a threshold.

Claim 50 (previously presented): The apparatus of claim 49 wherein the processor is programmed to perform the method further comprising:

sounding an alarm when the composite measure is below the threshold.

Claim 51 (previously presented): The apparatus of claim 49 wherein the processor is programmed to perform the method further comprising:

generating electrical control signals pursuant to an algorithm when the composite measure is below the threshold.

Claim 52 (previously presented): The apparatus of claim 41 wherein the processor is programmed to perform the method further comprising:

acquiring image data via computerized microscopy; and

wherein the biological process is microscopic at the tissue, cellular or subcellular level.

Claim 53 (previously presented): The apparatus of claim 41 wherein the biological process is macroscopic.

Claim 54 (previously presented): The apparatus of claim 53 wherein the macroscopic biological process is drowsiness.

Claim 55 (previously presented): The apparatus of claim 53 wherein the processor is programmed to perform the method wherein the step of receiving image data includes receiving data of facial images of an operator.

Claim 56 (previously presented): The apparatus of claim 55 wherein the one or more regions comprises an eye region, a mouth region and a facial boundary region.

Claim 57 (previously presented): The apparatus of claim 41 a video unit for acquiring said image data.

Claim 58 (previously presented): The apparatus of claim 41 wherein the processor is programmed to perform the method wherein said step of filtering comprises:

determining whether a video intensity level of each pixel is within the pixel intensity range; and

setting the video intensity level to a predetermined value if the video intensity level is within the range and to another predetermined value if the video intensity level is outside the range to provide the filtered output.